REMARKS

Applicant has amended paragraph [0030] beginning on p. 7, line 12 to delete the sentence incorporating a commonly owned U.S. Patent Application entitled "Passivation of GaN Devices in Epitaxial Growth Chamer."

§ 112

The Patent Office rejected claims 17-23 and 27-33 under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Applicant has amended claim 15 to correct a typographical error by deleting "nucleation and." As such, claim 17 is not indefinite for claiming "a nucleation layer." Similarly, Applicant has amended claim 26 to correct a typographical error by deleing "nucleation and." As such, claim 27 is not indefinite for claiming "a nucleation layer." Applicant has also amended claims 22 and 32 to correct "GaN cap layer" to "cap layer" such that there is proper antecedent basis. Thus, claims 17-23 and 27-33 are no longer indefinite, and the rejection of these claims under 35 U.S.C. § 112, second paragraph, should be withdrawn.

§ 103

The Patent Office rejected claims 15-23 and 26-33 under 35 U.S.C. § 103(a) as being unpatentable over Ogawa (U.S. Patent No. 6,750,158) in view of Yonehara (U.S. Patent No. 6,656,271) or Miyabayashi (U.S. Patent No. 6,660,606). In rejecting claims under 35 U.S.C. § 103, the examiner bears the initial burden of presenting a *prima facie* case of obviousness. According to MPEP 2143.03, "[t]o establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art."

Regarding claim 15, the combination of Ogawa and Yonehara or Miyabayashi fails to teach or suggest at least depositing a sacrificial expitaxial layer on a substrate and oxidizing the sacrificial layer to separate the substrate from one or more structural expitxial layers. As illustrated in Figures 1A-1E, Ogawa discloses a GaN buffer layer (not shown) and an n-type contact layer 12 sequentially grown on a substrate (11) (see column 3, lines 60-65). As stated in column 4, lines 22:

> As shown in FIG. 1B, after the epitaxial substrate is taken out of the reaction chamber of the MOVPE apparatus, the mother substrate 11 is irradiated with laser light 80 from the surface opposite to the n-type contact layer 12, so that

> a thermally decomposed layer 12a obtained by thermally decomposing the n-type contact layer 12 is formed at the interface of the n-type contact layer 12 with the mother substrate 11.

Thus, the thermally decomposed layer (12a) is a thermally decomposed portion of the contact layer (12) formed by irradiating a surface of the contact layer (12) by laser light (80) through the substrate (11), as illustrated in Figure 1B. After forming the thermally decomposed layer (12a), epitaxial layers (13-16) are grown. (See column 4, line 53 – column 5, line 4). As discussed in column 5, lines 18-20, the contact layer (12) is separated from the substrate (11) by using hydrochloric acid to remove the thermally decomposed layer (12a).

In rejecting claim 15, the Patent Office stated that column 3, lines 60-61 discloses depositing a sacrificial epitaxial layer on a substrate. Column 3, lines 60-61 discloses "a buffer layer (not shown) made of gallium nitride (GaN)." Thus, the Patent Office had indicated that the buffer layer (not shown) of Ogawa is a sacrificial layer. However, the buffer layer (not shown) of Ogawa is not oxidized or otherwise removed to separate the contact layer (12) from the substrate (11). Rather, as discussed above, a portion of the contact layer (12) is thermally decomposed using laser light (80) to form a thermally decomposed layer (12a) of the contact layer (12). This thermally decomposed layer (12a), rather than the buffer layer (not shown), is removed by hydrochloric acid to separate the contact layer (12) from the substrate (11). Thus, the buffer layer (not shown) of Ogawa is not a sacrificial layer.

As for the thermally decomposed layer (12a), it too is not a sacrificial layer deposited on a substrate and oxidized to separate the substrate from one or more epitaxial layers, as claimed. Rather, the thermally decomposed layer (12a) is a thermally decomposed portion of the contact layer (12) that is formed after the contact layer (12) is deposited on the substrate (11) by irradiating a surface of the contact layer (12) by directing laser light (80) through the substrate (11). Thus, Ogawa fails to teach or suggest a sacrificial layer deposited on a substrate.

Further, even when Ogawa is combined with either Yonehara or Miyabayashi, this deficiency is not cured. Yonehara teaches forcibly separating bonded wafers by generating internal pressure within a porous Si layer by causing it to expand through oxidation (col. 37, lines 31-39). The porous layer is formed by anodizing the surface of a wafer. For example, see col. 1, lines 58-62; col. 13, lines 40-43; col. 14, lines 61-64; col. 16, lines 17-19; and col. 20, lines 9-12, where each of these passages disclose forming the porous layer by anodizing the surface of the wafer. However, Yonehara fails to teach or suggest depositing a sacrificial layer

on a substrate and oxidizing the sacrificial layer to separate the substrate from one or more structural epitaxial layers deposited on the sacrificial layer.

Miyabayshi teaches forming a porous layer (133) on a first substrate (131) by anodizing the first substrate (131) in an HF solution (see col. 3, lines 26-56). A non-porous single-crystal semiconductor layer (123) and a silicon oxide layer (122) are sequentially formed on the porous layer (133). Then, the structure (substrate 131, porous layer 133, non-porous layer 123, and the oxide layer 122) is attached to a second substrate (121) such that the first substrate (131) is attached to the second substrate (121) via the oxide layer (122). Then, the substrates (131, 121) are separated along the porous layer (133) by, for example, applying internal pressure to the porous layer (133) by expanding the porous layer (133) from the periphery by oxidation. (see col. 4, lines 40-52). As a result, the non-porous single-crystal semiconductor layer (123) and the silicon oxide layer (122) are transferred from the first substrate (131) to the second substrate (121). However, Miyabayashi fails to teach or suggest depositing a sacrificial layer on a substrate and oxidizing the sacrificial layer to separate the substrate from one or more structural epitaxial layers deposited on the sacrificial layer.

Thus, the combination of Ogawa, Yonehara, and Miyabayashi fails to teach or suggest depositing a sacrificial layer on a substrate and oxidizing the sacrificial layer to separate the substrate from one or more structural epitaxial layers deposited on the sacrificial layer. Accordingly, claim 15 is allowable.

For at least the same reasons claim 15 is allowable, claims 16-35 are also allowable. However, Applicant reserves the right to further address the rejections of claims 16-35 in the future if necessary.

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Date: October 22, 2004
Attorney Docket: 2867-205